

U.S. Pat. Appl. No. 10/630,094
Amd. dated March 31, 2004

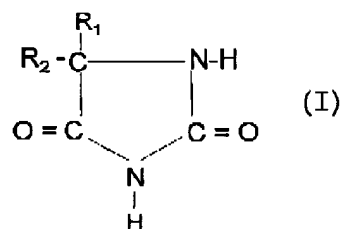
Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Please amend claim 22 as shown in the following listing:

1. (Previously Presented) A process for the preparation of an α -amino acid by a reaction comprising hydrolyzing a hydantoin of the formula



in which

R₁, R₂: can be identical or different, and represent hydrogen, alkyl having from 1 to 6 carbon atoms, straight-chain or branched chain; or alkylene radicals having from 1 to 6 carbon atoms which are closed to form a ring when R₁ and R₂ taken together are alkylene or, when R₁ or R₂ represents alkylene, are bonded to methylthio, mercapto, hydroxyl, methoxy, amino groups or halogen atoms, or

R₁ and R₂: can also be a phenyl group which is optionally substituted by methyl, hydroxyl groups or halogen atoms,

in the presence of water, ammonia as starting materials and at least one metallic oxide as catalyst, selected from the group consisting of TiO₂, TiO₂/Al₂O₃, Nb₂O₅/Al₂O₃, ZnO and

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ZrO₂, in a saponification zone under conditions in which all starting materials are completely dissolved in the water and only one further phase is present in the reactor in addition to the solid phase of the metallic oxide.

2. (Original) The process according to claim 1, wherein the reaction is carried out at a temperature of from 120 to 250°C and a pressure of from 80 to 300 bar (250,000 hPas) in the presence of carbon dioxide.
3. (Original) The process according to claim 1, wherein the ammonia, optionally in the form of a water/ammonia mixture, is mixed in an amount of from 5 to 40 moles NH₃, based on moles of hydantoin, with the hydantoin-containing solution and fed into the saponification zone.
4. (Original) The process according to claim 1 wherein said halogen atoms are selected from the group consisting of fluorine and chlorine.
5. (Original) The process according to claim 2, wherein the ammonia, optionally in the form of a water/ammonia mixture, is mixed in an amount of from 5 to 40 moles NH₃, based on moles of hydantoin, with the hydantoin-containing solution and fed into the saponification zone.
6. (Original) The process according to claim 1, further comprising feeding a water/ammonia mixture or a hydantoin-containing solution optionally containing ammonia and optionally containing carbon dioxide into the saponification zone under pressure at a temperature of from 180 to 500°C.
7. (Original) The process according to claim 3, further comprising feeding a water/ammonia mixture or a hydantoin-containing solution optionally containing ammonia and optionally containing carbon dioxide into the saponification zone under pressure at a temperature of from 180 to 500°C.
8. (Original) The process according to claim 1, wherein R₁ corresponds to hydrogen and R₂ corresponds to the isopropyl, 2-methylpropyl or phenyl radical or hydrogen.

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9. (Previously Presented) The process according to claim 1, wherein R_1 corresponds to hydrogen and R_2 corresponds to a methylmercaptoethyl radical.
10. (Original) The process according to claim 1, wherein the hydantoin is present in the hydrolysis mixture in a concentration of from 150 to 600 g/l.
11. (Original) The process according to claim 1, wherein the catalyst is TiO_2 in the crystalline form anatase.
12. (Original) The process according to claim 1, wherein the metallic oxide is in the form of a fixed bed.
13. (Original) The process according to claim 1, wherein the catalyst is present in an amount of from > 0 to 0.1 kg, based on 1 kg of hydantoin.
14. (Original) The process according to claim 1, wherein the process is carried out continuously, semi-continuously or discontinuously.
15. (Previously Presented) The process according to claim 1, further comprising following saponification, lowering the pressure, during the discharge from the saponification zone of a mixture obtained after the hydrolysis, separating ammonia and carbon dioxide, together with water vapour, from a liquid phase as a separated liquid phase.
16. (Original) The process according to claim 15, further comprising optionally returning to the hydantoin synthesis amounts of ammonia and carbon dioxide formed in the hydrolysis reaction.
17. (Original) The process according to claim 15 further comprising feeding a remainder of the ammonia and carbon dioxide into the saponification zone at a temperature of from 180 to 500°C, and a pressure of from 80 to 300 bar.

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18. (Previously Presented) The process according to claim 15 wherein the α -amino acid is isolated from said separated liquid phase.
19. (Previously Presented) The process according to claim 17 wherein a remaining portion containing unreacted hydantoin is mixed with fresh hydantoin-containing solution upstream of the saponification zone, and is fed into the saponification zone.
20. (Original) The process according to claim 17 wherein the temperature is 210° to 360°C.
21. (Original) The process according to claim 17 wherein the pressure is 110 to 200 bar.
22. (Currently Amended) The process according to claim 1, further comprising
following saponification, lowering pressure, during the discharge from the saponification zone of the mixture obtained after the hydrolysis, separating ammonia and carbon dioxide, together with water vapour, from a liquid phase, as a separated liquid phase,
optionally returning to the hydantoin synthesis a portion corresponding to the amounts of ammonia and carbon dioxide formed in the hydrolysis reaction,
feeding the remainder of the ammonia and carbon dioxide into the saponification zone at a temperature of from 180 to 500°C, and a pressure of from 80 to 300 bar,
isolating said α -amino acid from said separated liquid phase,
mixing the remaining portion containing unreacted hydantoin with fresh hydantoin-containing solution upstream of the saponification zone, and feeding it
into the saponification zone.